Sustainability Problems
Go Fix it
11/26/12

Kyle Maggy
Word Count: 1079

Feasibility of Rainwater Harvesting as Solution to Water Scarcity

Water scarcity due to economic and physical scarcity and contamination affects one in every three people on every continent of the globe; this figure comes directly from the World Health Organization. Of this overall figure, 1.3 billion people live in areas with physical water scarcity and almost 2 Billion people are faced with water scarcity due to lack of infrastructure and related economic factors. Associated risks of water scarcity include dehydration, death, wastewater use in agriculture, consumption of toxins, etc. In more developed nations there are also significant issues related with scarcity. Developed nations are still highly susceptible to droughts, contamination, and privatization. The stakeholders of the water scarcity problem consist of global citizens, governments, NGO's, multinational corporations, and the environment. If the problem goes unaddressed, environmental, economic, and social sustainability will remain a risk. While a large-scale solution is commonly thought of as necessary to solving the global water crisis, I will look at the feasibility of localized rainwater harvesting as a supplement to water delivery and consumption.

Terry Thomas of the University of Warwick, in "Domestic water supply using rainwater harvesting", advocates that domestic water demand can be met in whole, or in part, by localized rainwater harvesting. Dependant on location, human beings can consume up to 70 gallons of freshwater per day, which is used for drinking, washing clothes, personal hygiene, agriculture, watering lawns, etc. On the low side, in more water scarce areas, an individual consumes an average of 1.8 gallons daily, mainly for drinking and hygiene. In most climates, humans can survive off of as low as .5 gallons daily, solely for drinking. Thus, climate region permitting rainwater harvesting should be capable of producing the necessary amount of drinking water for individuals and small households. This is under the assumption that individuals have access to the required harvesting materials. Overall, Thomas emphasizes the heightening competition between household and agricultural/commercial consumption of water, and how rainwater harvesting in a domestic setting can help offset, if not completely cover, water demands.

For obvious reasons, Thomas' conclusions have fatal flaws. Thomas underestimates the effects of climate, variability/ risk, frequency, and infrastructure required for rainwater harvesting. Often these issues are most prominent in poorer developing nations. Dr. M. Dinesh Kumar, in "Roof Water Harvesting for Domestic Water Security: Who Gains and Who Loses?" provides an alternative opinion. Dr. Kumar concludes that in underdeveloped nations that are at the highest risk of water scarcity, rainwater-harvesting systems are not feasible due to economic reasons and accessibility to resources. In rural areas accessibility and affordability of materials and education is the largest problem. In urban areas, there is simply not enough surface area on multiple level buildings to support many individuals and families. Kumar concludes that there is too much complexity and variability to rely on rainwater harvesting for domestic water security. However, he does say that in some situations rainwater harvesting is a good, and conditions permitting superb, supplement to traditional water infrastructure sources. Overall, due to economic and geographic accessibility of material and fiscal resources rainwater harvesting is most beneficial and efficient when used by upper-middle-class and upper-class citizens in developed nations.

After reviewing Thomas' and and Kumar's opinion, and pinning them against W.H.O. Statistics, I tend to agree with Kumar's opinion. Rainwater harvesting is not a reliable enough source for domestic water security. However, if rainwater harvesting is feasible considering individual economic and geographic settings, I believe it is irresponsible to not utilize rainwater-harvesting technologies. It is free clean water that is perfect for washing, watering, and other applications as is without any purification. Therefore, I conclude that localized rainwater harvesting can be classified as a supplemental sustainability solution, being that it is not always viable. That being said, I believe that governments should continue to research utility scale rainwater collection.

Source Annotations

1. "10 Facts about Water Scarcity." *WHO*. World Health Organization, n.d. Web. 26 Nov. 2012. <http://www.who.int/features/factfiles/water/en/index.html>.
2. Thomas, T. "Domestic Water Supply Using Rainwater Harvesting." *Building Research and Information* 26.2 (1998): 94-101. Web.
    - Terry Thomas is a senior lecturer at the University of Warwick. He did his bachelors work at Cambridge and PHD at Warwick. Thomas concentrates his research in engineering in developing countries, rainwater harvesting, rural

energy, local manufacturing, landmine clearance, building materials, and water lifting. The main topic of this paper is how rainwater harvesting can be a dominant form of water collection and production in both rural and urban settings in developing and developed nations. Thomas makes his argument through discussing social, economic, environmental, and technological factors associated with both water scarcity and rainwater harvesting. Thomas provides key figures and statistics that allow readers to get a good grasp of his research and conclusions. Thomas also discusses some of the specifics about the various technological solutions. Thomas' research supports my personal conclusions in that rainwater harvesting is a partial solution to water scarcity. I however am still skeptical of the reliability of the rainwater. To make my argument I used some of Thomas' figures and partial conclusions.

3. Kumar, M. D. "Roof Water Harvesting for Domestic Water Security: Who Gains and Who Loses?" *Water Interntional* 29.1 (2004): 43-53. Web.
    - Kumar is Executive Director at the Institute for Research Analysis and Policy. At the time of the journal entry Kumar was associated with the International Water Management Institute. His research and writing focuses in water management, water use is developing nations, and social and economic issues regarding water usage. Dr. Kumar has over 20 years of experience in water management working with governments and NGO's including Unicef, the Ford Foundation, Bangalore, New Delhi, and the IDRC. Kumar's main argument that solely the use of rainwater harvesting is not a feasible solution to water scarcity. He points out that various economic issues and infrastructure issues make it near impossible for the most in need regions to efficiently and effectively harvest rainwater. He makes his argument through separating the separate issues, providing cases of failure, and pointing out that rainwater harvesting should only be used as a supplement. Kumar also points out that developed countries that have access to the necessary resources for rainwater harvesting rarely utilize harvesting systems. Kumar's findings support my conclusions in that rainwater harvesting to economic barriers and rain uncertainty do not make for a secure, reliable, water source. I used some of Kumar's figures and examples in making my argument.